ORP Upgrade Kit

For the AquaRite™+

Owner's Manual

To prevent potential injury and to avoid unnecessary service calls, read this manual carefully and completely.

SAVE THIS INSTRUCTION MANUAL

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HAYWARD®

WARNING: Electrical hazard.
Failure to comply with these instructions can result in serious injuries or death.

THE EQUIPMENT IS INTENDED TO BE USED ONLY ON PERMANENTLY CONSTRUCTED POOLS AND SPAS

⚠ **WARNING –** Disconnect/isolate the equipment from the electricity supply before any installation/service/repair.

⚠ **WARNING –** All electrical wiring must be performed by a qualified and licensed electrical contractor in accordance with all Local/State/ Federal Gorvernment electrical regulations and the latest edition of the AS/NZS 3000 Wiring Rules.

⚠ **WARNING –** Ensure that the device is plugged into a power outlet that is protected against short-circuits. The device must also be powered via an isolating transformer or through a residual current device (RCD) with a fixed residual operating current not exceeding 30 mA.

⚠ **WARNING –** Check that the supply voltage required by the product corresponds to the voltage of the distribution network.

⚠ **WARNING –** To reduce the risk of electric shock, do not use an extension cord to connect the device to the mains. Use a suitably rated GPO as per the standard AS/NZS 3000.

⚠ **WARNING –** If the power supply cord is damaged the device must not be used. The power supply cord must be replaced by the manufacturer, the after-sales service professional or similarly qualified persons to avoid danger.

⚠ **WARNING –** Carefully read the instructions that appear in this manual and on the device. Failure to comply with the instructions can cause injuries. This document must be given to the pool owner, who should keep it in a safe place.

⚠ **WARNING –** The appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

⚠ **WARNING –** Use only genuine Hayward replacement parts.

⚠ **DANGER -** Chemical Hazard: Mixing Chemicals or adding water to acid may result in explosion, fire and/ or toxic gas release. To avoid death, serious injury or major property damage, do not mix Chlorine tablets with Calcium Hypochlorite, or with any other form of concentrated Chlorine. Do not mix any chemicals with Hydrochloric Acid (HCL). Chlorine and Hydrochloric Acid must be used and stored apart in well ventilated areas as per local codes and regulations.

⚠ **DANGER -** Chemical Hazard: Hydrochloric Acid (HCL) & Chlorine (liquid and vapour) can cause severe burns; may be fatal if swallowed or inhaled. Inhalation can cause severe lung damage. To avoid death or serious injury:

- Wear eye and skin protection while maintaining or servicing this unit.
- If inhaled move to an area of fresh air and seek medical attention immediately.
- If swallowed contact local poison information service center or physician immediately. Give large amounts of milk or water.

- Wear chemical resistant clothing including chemically resistant gloves. If skin contact occurs, wash with soap and water for at least 20 minutes. Remove contaminated clothing and shoes. Contaminated clothing should be discarded or at least cleaned before reuse.

- Use splash resistant safety goggles. If eye contact occurs, seek immediate medical attention. Flush eyes immediately with clean clear water continuously for at least 20 minutes.
- Use in a well-ventilated area only

⚠ **WARNING -** Hazardous Waste: Hydrochloric Acid and Chlorine can cause corrosion, which can cause injury or property damage. To avoid, dispose of used/unwanted acid and/or liquid chlorine at an approved hazardous waste facility. Call your local fire department in the case of significant spills on 000.

INTRODUCTION

The ORP Upgrade Kit is an optional accessory to add on to the AquaRite+'s optional pH Upgrade Kit. With the pH Upgrade Kit fitted to the AquaRite+, it enables the unit to measure the pH level of the water and, if it is above the set point, automatically dose liquid acid to reduce the pH back to the set point level. Fitting the ORP Upgrade Kit allows the AquaRite+ to then measure the Oxidation Reduction Potential (ORP or Redox) of the pool/spa water and activate the TurboCell to produce chlorine if the ORP measurement is below the set point.

Measuring the ORP of the water tells us the quality and/or the ability of the chlorine in the water to oxidize unwanted substances in the water like organic matter and ammonia like compounds. A good starting point for the ORP/Redox set point is explained in the "Setting The ORP/Redox Level" section on page 8.

When chlorine is produced by the TurboCell at a pH between 7.2 and 7.6, more effective stronger hypochlorous acid (HOCl) is produced than the less effective weaker hypochlorite ion (HCl-) which is predominantly produced when the pH is over 7.6.

Having a free chlorine water test reading of 2 ppm will have very different ORP/Redox readings depending on what the pH level of the water is. This is why we explain on page 8 how to get a starting ORP/Redox set point and then make small adjustments of 10mV per day until the free chlorine level that you want to achieve has been met. As long as the water balance is maintained within the same levels as when the unit was set, the ORP/Redox set point will need minimal ongoing adjustment.

COMPONENTS

ORP Probe

ORP Chip Set

pH Upgrade Kit

(Needs to already be installed)

pH Probe

Measuring Chamber

Peristaltic Pump

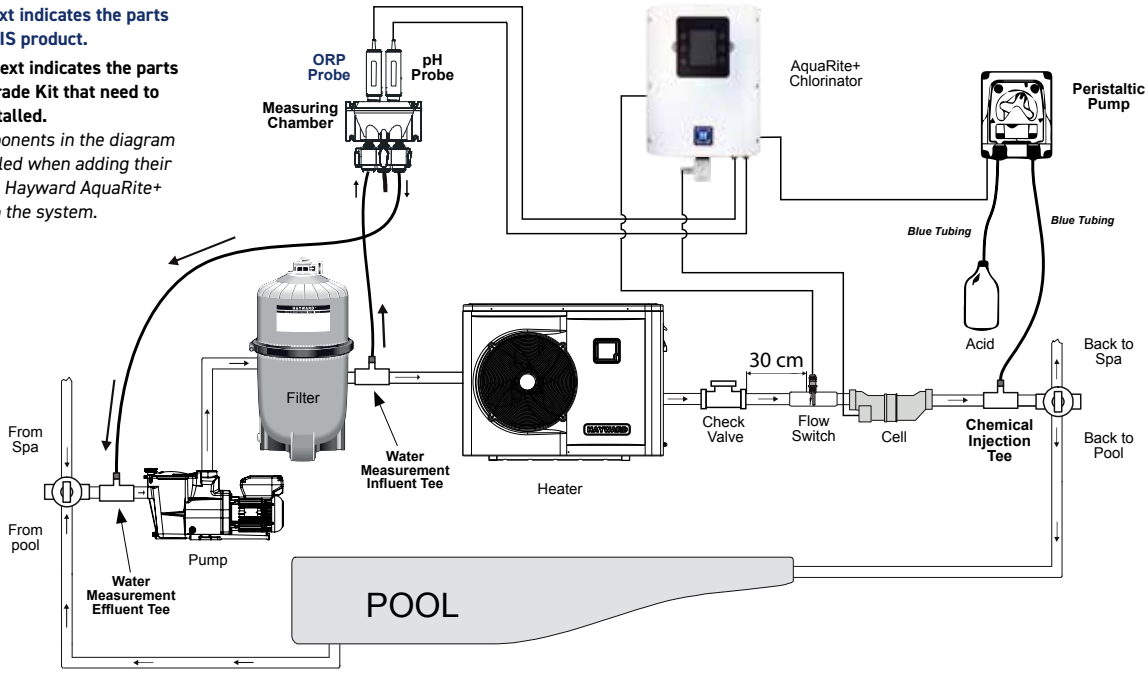
pH Chip Set

Cable Gland

NOTE

» **Blue bolded text indicates the parts included in THIS product.**

» **Black Bolded text indicates the parts of the pH Upgrade Kit that need to already be installed.**
All other components in the diagram are only installed when adding their corresponding Hayward AquaRite+ Upgrade Kit to the system.

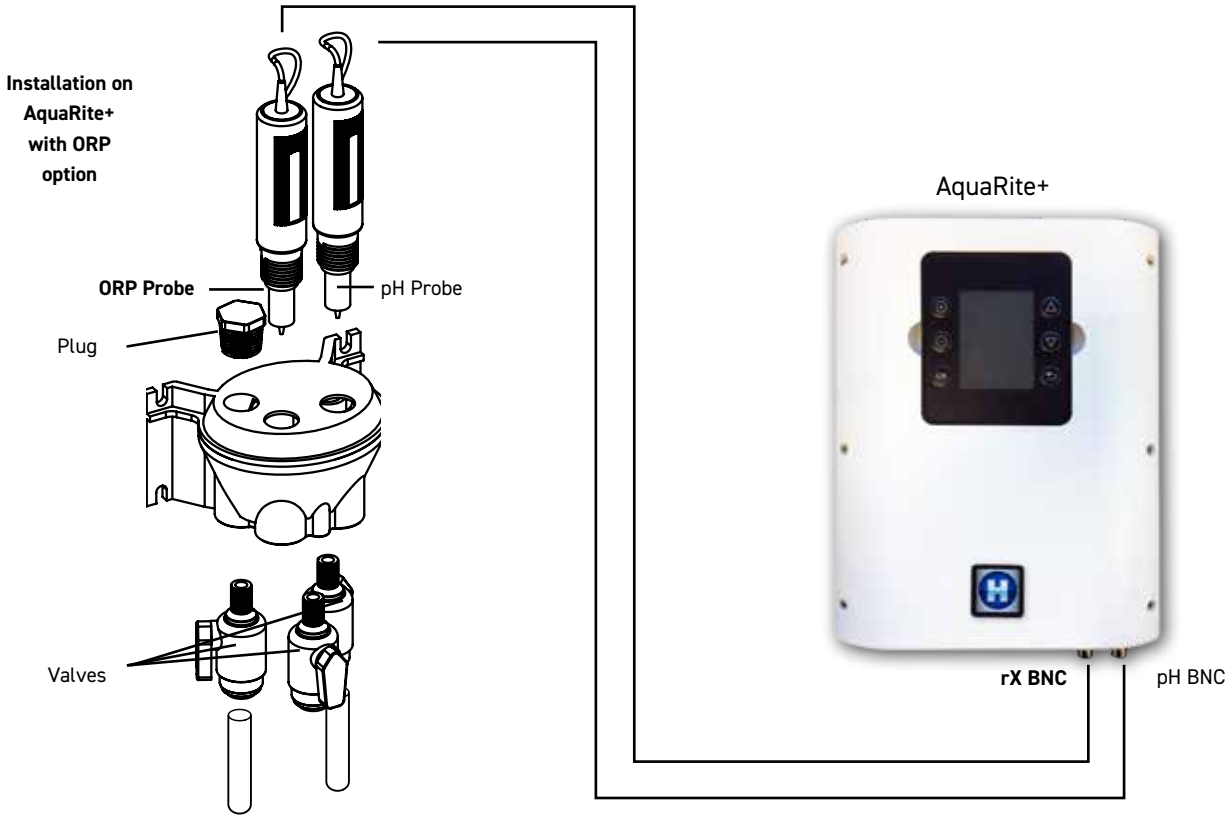


Installation Schematic

INSTALLATION

Installing the ORP Probe on the Measuring Chamber

The ORP probe is "wet" packed and protected by a plastic cap. The probe tip must always remain wet. If the probe is allowed to dry, it will be permanently unusable (not covered by the warranty).
Remove the ORP probe from its plastic protective cap and set the cap aside for later use (winterising). To ensure that the probe remains wet at all times, fill the measuring chamber with pool water before installing the probe. Apply a length of thread tape to the probe's threads. **Tighten the probe by hand only.** Check that they are watertight at startup. If the probe leaks, do not tighten it further. Remove the probe and reapply the thread tape, then reinsert the probe.
After installation, check that the probe is constantly in contact with the water in the chamber. The measuring chamber will hold sufficient water to protect the probe when the pump is off during day to day filtration. If the pump will be off for extended periods of greater than one week, it is recommended to remove the probe and fill the plastic cap that came with the probe full of water and screw it to the probe for storage.



Installing the ORP Probe to the AquaRite+

Once the ORP probe is installed correctly in the measuring chamber, it can now be connected to the AquaRite+. The ORP probe needs to be physically connected to the AquaRite+ and activated by installing the ORP chip set.

Installation should follow these steps:

- Screw the ORP probe into the measuring chamber, alongside the pH probe
- Remove the Dead Front Panel
- Connect the BNC connector on the ORP probe to the ORP/Rx BNC input on the AquaRite+ (Shown above)
- Fit the ORP Chip Set in the terminal labelled rX on the AquaRite+ PCB

ELECTRICAL

Removing the Dead Front Panel

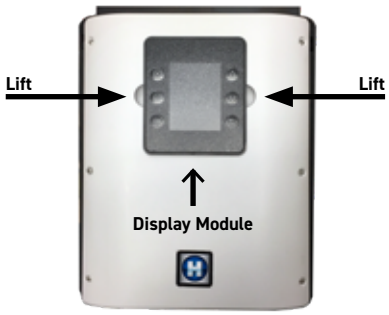
In order to install the ORP chip set to the AquaRite+ circuitry, the Dead Front Panel needs to be carefully removed. Follow the instructions below to avoid damaging the device and/or its casing.

⚠ Caution - Risk of Electric Shock.

Ensure that the unit has been disconnected from all power supplies before removing the Display and Dead Front Panel. Only a suitably qualified person should remove the Dead Front Panel in accordance with Local/ State/Federal Government regulations and the latest edition of the AS/NZS 3000 Wiring Rules.

Lift Out Interactive Display Module:
Remove display module from its compartment. Use the grooves on either side to pry it out by hand. Take care to not use excessive force as the module is still wired to the PCB at this stage.

1.



2.

Detach Interactive Display Module:
Turn over the display module and remove the wired plug from the port on the back of the unit. Store the Display Module where it will not get damaged until it is re-installed.

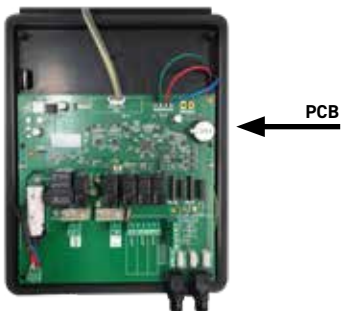
3.

4.

Unscrew Dead Front Panel:
Remove the six (6) screws fastening the panel to the unit. Once all loose, lift the panel off the unit to access the PCB.

5.

6.

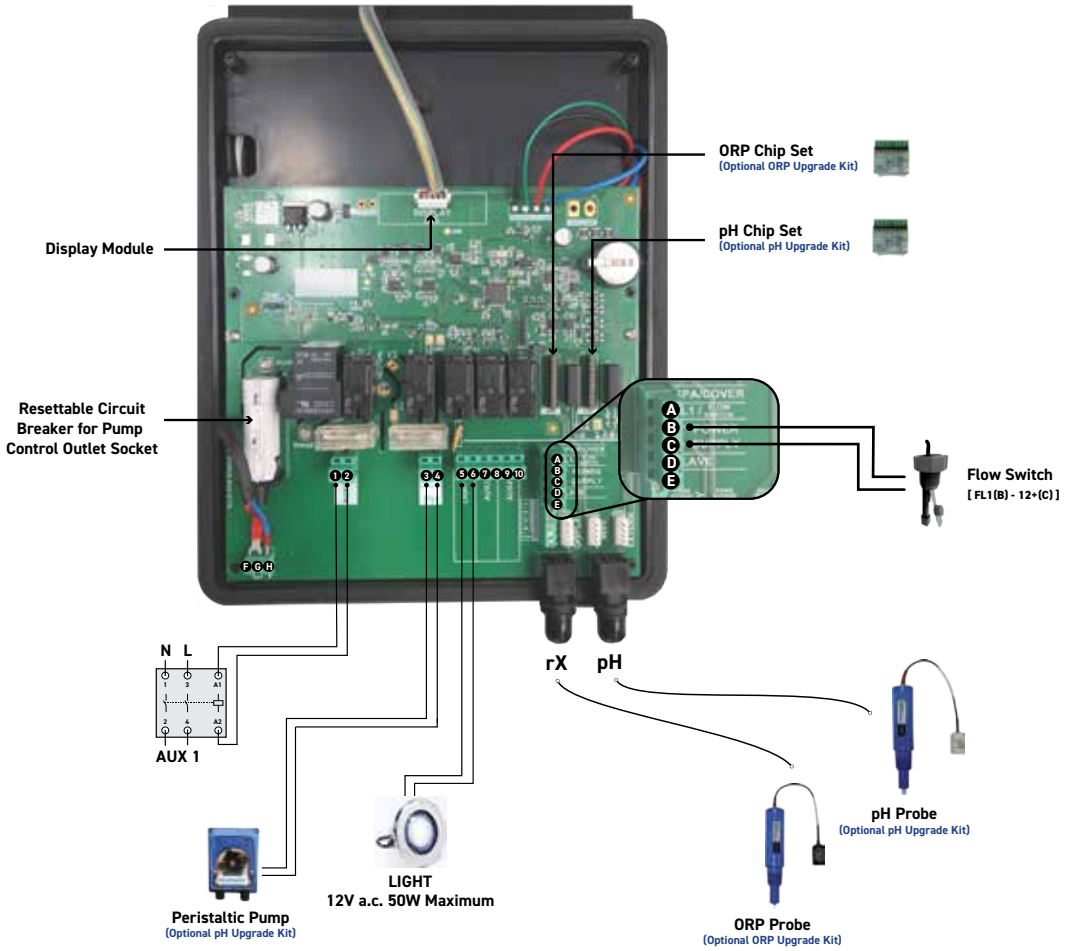


ELECTRICAL CONTINUED

Wiring to the AquaRite+

Connect the AquaRite+ to a GPO with a permanent power supply only.

⚠ **CAUTION - This circuit must be protected by a residual current device (RCD) with a fixed residual operating current not exceeding 30 mA.**



Wiring Schematic

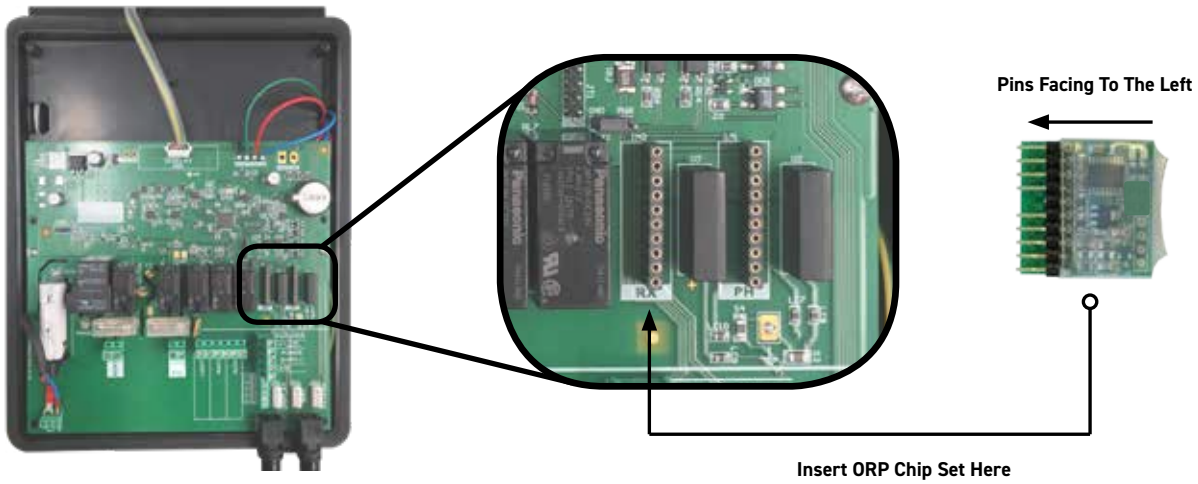
Description of Outgoing Relays

Name	Description	Terminals	Type of output	Max Load
Filter Pump	Filtration pump control	Socket Outlet	240 V a.c.	7 A
Aux 1	Auxiliary voltage output (for contactor switching control)	1 - 2	240 V a.c.	1 A
pH	Peristaltic acid pump	3 - 4	SELV 24 V a.c.	1 A
Light	Lighting control (One {1} LED light only)	5 - 6	SELV 12 V a.c.	50 W
Aux 3	Auxiliary dry contact	7 - 8	Dry contact	1 A
Aux 4	Auxiliary dry contact (or heating control).	9 - 10	Dry contact	1 A

ELECTRICAL CONTINUED

Fitting the ORP Chip Set

Installing the chip set updates the firmware of the AquaRite+, unlocking the ability to control the ORP level of the pool or spa when used in conjuction with the pH probe and perisaltic pump. Insert the ORP Chip Set into the terminal on the AquaRite+ PCB as shown below ensuring the pins are facing to the left. After this, access to the PCB is no longer required and the Dead Front Panel can be screwed back on. Ensure that the gasket is fitted correctly before securing the Dead Front Panel and then reinstall the display module.



WATER CHEMISTRY

Water Balance

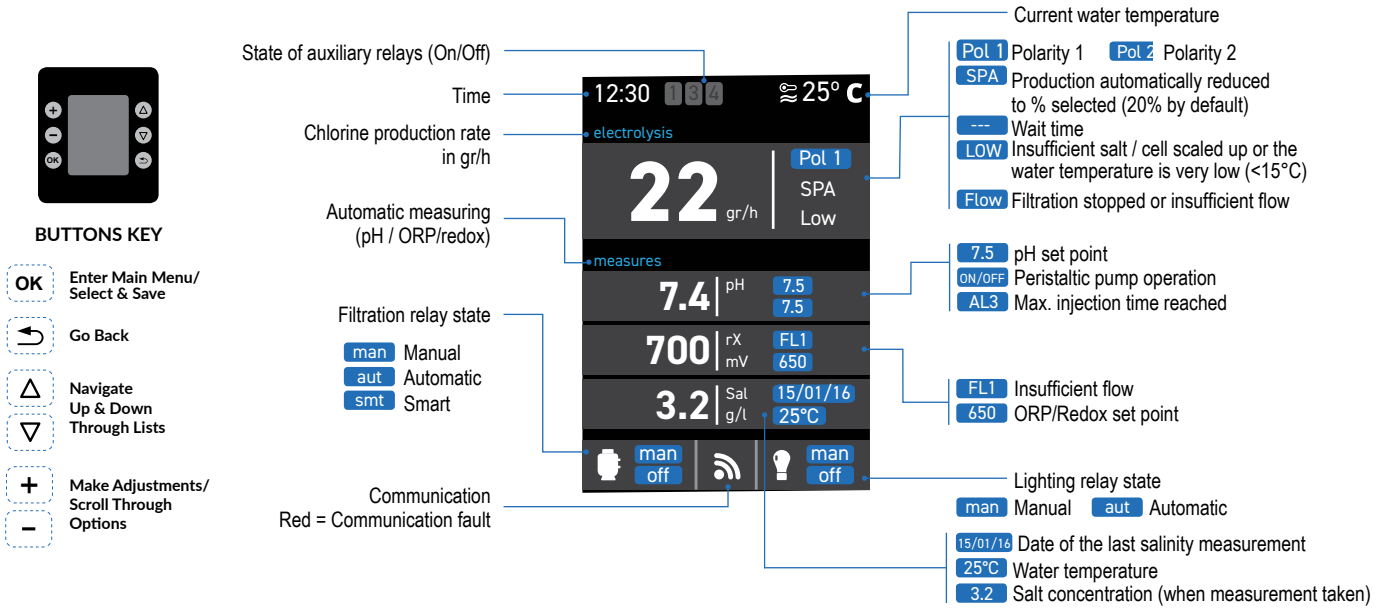
The water must be balanced manually **BEFORE** the device is started up.
The following table summarises the ideal chemical levels recommended by Hayward. Your water should be checked regularly to maintain these ideal levels in order to minimise surface corrosion, scaling or deterioration and to ensure maximum performance from your AquaRite+ Chlorinator and accessories.

CHEMICAL	IDEAL LEVELS
Salt	2.7 to 3.4 g/L (2700 ppm - 3400 ppm)
Free chlorine	1.0 to 3.0 ppm
pH	7.2 to 7.8
Cyanuric acid (Stabiliser)	30 to 50 ppm max. (Add stabiliser only if necessary) 0 ppm in indoor pool
Total alkalinity	80 to 120 ppm
Calcium hardness	200 to 400 ppm
Metals	0 ppm
Saturation index	-0.2 to 0.2 (0 best)

OPERATION

Inserting the ORP Chip Set updates the AquaRite+ interface to include the ORP/Redox set-up options. The existing set up instructions detailed in the AquaRite+ Owner's Manual and pH Control Kit Owner's Manual still stand, just more settings options appear that are specific to the ORP function. Below is the updated home screen and instructions on configuring the ORP settings now available.

Home Screen Configuration



Setting the ORP/Redox Level

The ORP/Redox level tells you the Oxidation Reduction Potential, i.e. the disinfectant capacity of the water.
Setting the ORP/Redox set point is the last step in setting the AquaRite+.
To find the optimum redox level for your pool, follow the steps below:

1. Start up the pool filtration system (the salt in the pool must be evenly dissolved).
2. Add chlorine to the swimming pool until it reaches 1 to 1.5 ppm. The pH level must be at the set point that you will run the system at, between the range of 7.2 and 7.8.
3. After 30 min. Check whether the level of free chlorine in the pool (manual DPD1 test kit) is between 0.8 and 1.0 ppm.
4. Look at the redox value on the screen and enter it as the redox set point.
5. The next day, check the free chlorine levels (manual DPD1 test kit) and the redox level. Increase / reduce the setting in small increments of 10 mV per day, if required, in order to maintain the desired free chlorine level.

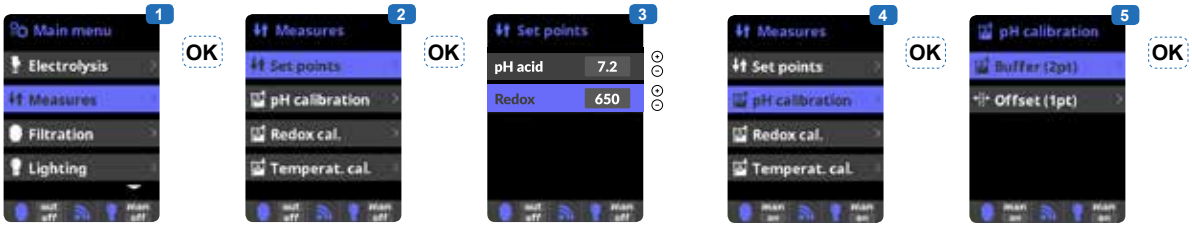
Remember to check the water balance, referring to the Hayward Ideal Chemical Levels (page 7), fortnightly (or sooner if there is a high bather demand) and adjust the ORP/redox set point according to the steps listed above.

NOTE: The WHO deem drinking water with an ORP reading of 650 mV to be adequately disinfected for consumption. A swimming pool or spa with an ORP reading of between 700 mV and 720 mV allows for quick disinfection and for breakpoint chlorination. E. Coli is killed in approximately 1 to 2 seconds with an ORP level of 750 mV.

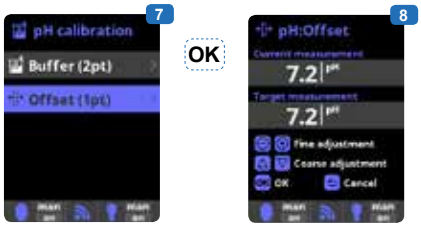
www.Bcosy.be - Waarschoot - België - Belgique - Belgium - Belgien tel 0032 (0) 9 378 24 30 Mail: info@bcosy.be

OPERATION CONTINUED

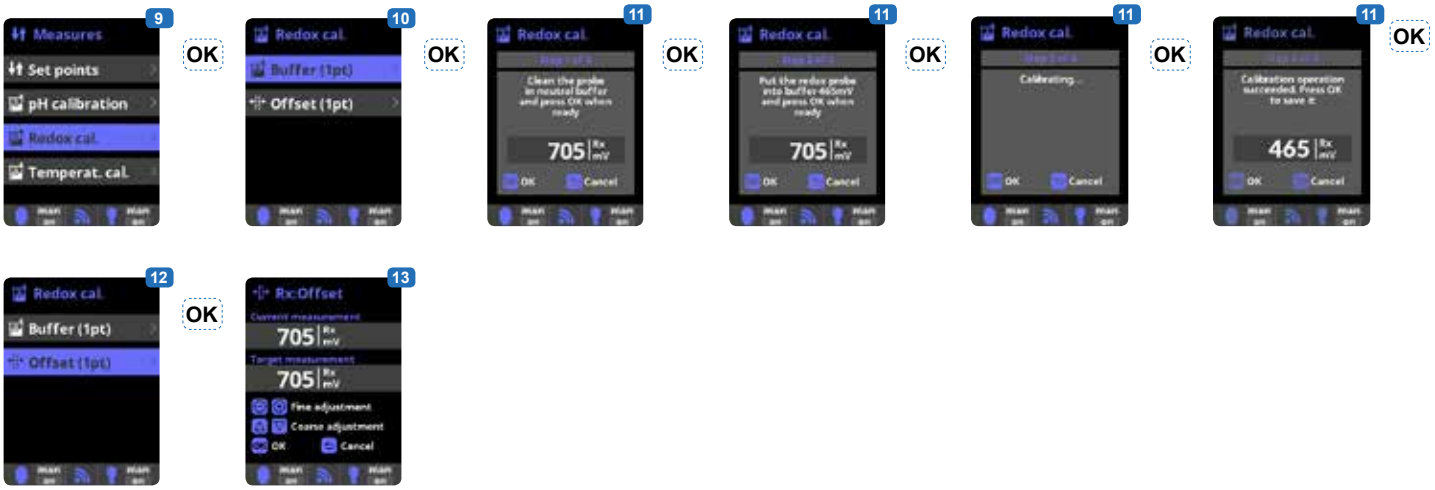
ORP/pH Set Point & Probe Calibration



1 **Measures**: Adjustment of set points and probe calibration.
2 **Set points** for each measurement.
3 **Setting** the set points.
4 **pH probe calibration:** Recommended once a month during the pool season.
5 **Calibration** using buffer solutions (liquids models pH7 / pH10 / neutral). Follow the on-screen instructions (fig. 6).
7 **Manual calibration:** Allows you to set the probes to 1 point (without buffer solution) – recommended only for adjusting small deviations in readings.
8 Without removing the probe from the water, use the + / - keys to adjust the reading to your reference value (pool shop pH test value or test from a photometer test instrument).



9 ORP/**Redox probe calibration:** Recommended every two months during the pool season.
10 **Calibration** with reference solution 465 mV. Follow the on-screen instructions (fig. 11).
12 **Manual calibration:** Allows you to set the probes to 1 point (without solution) – recommended only for adjusting small deviations in readings.
13 Without removing the probe from the water, use the + / - keys to adjust the reading to your reference value.



SERVICING

Settling Period

During the first 10-15 days, your system will require more attention:

- Check that the pH remains at the ideal level (7.2 to 7.8).
- If the pH is exceptionally unstable and uses a lot of acid, check the Total Alkalinity (see table on page 7).

If the water balance is highly unstable, contact your pool shop or installer/builder.

REMEMBER:

- That the system needs a certain amount of time to adapt to your pool and will require additional chemicals during the first 3-5 days.
- The pool must be regularly maintained and the skimmer baskets emptied whenever necessary. Also check that your filter is not clogged.
- **Add Water**
  - It is preferable to add water via the skimmers so that it passes through the chlorinator cell before entering the pool. Remember to check the salt level after adding water.
- **Dosing Pump**
  - Regularly check the diluted acid level to ensure that the pump does not run dry. The dosing pump must be checked and serviced at regular intervals.

Servicing the Probes

The probes must be clean and free from oil, chemical deposits and contamination to function properly. As they are in continuous contact with the water in the pool, the probes may need to be cleaned weekly or monthly, depending on the number of bathers and other specific pool characteristics. A slow response, more frequent pH calibration and inconsistent readings indicate that the probes need to be cleaned.
To clean the probes, turn off the power to the AquaRite+ and disconnect from power supply.
Unplug the probe connectors from the control box, unscrew the probes and carefully remove them from the chamber. Clean the probe bulb (white ring at the bottom of the body of the probe) with a soft toothbrush and regular toothpaste.
A household washing-up liquid detergent may also be used to remove any oil. Rinse with fresh water, replace the thread tape on the threads, and reinstall the probes.
If the probes continue to give inconsistent readings or require excessive calibration after they have been cleaned, they should be replaced.

Probe Storage

The end of the probes must always be in contact with water or they will dry out. If they are removed from the measuring chamber, they should be stored in the plastic caps provided (filled with water).
If the storage caps have been misplaced, the probes should be stored separately in small glass or plastic containers with their ends immersed in water.
The probes must always be in a frost-free environment.

TROUBLESHOOTING

Alarm AL3: pH Acid Dosing Pump Stopped

- The maximum time allowed to attain the pH set point has been reached. The pH acid dosing pump is stopped to avoid overdosing and making the water too acidic.
- Please carry out the following checks to avoid equipment failure:
  - Check that the container of diluted liquid hydrochloric acid is not empty.
  - Check whether the pH read on the display corresponds to the pH in the pool (use a pH test kit). Otherwise, please calibrate the pH probe or replace it, if necessary.
  - Check that the pH pump is running normally.
  - To delete this message and reset the dosing, press the “Return” key.

WARRANTY

STANDARD CONDITIONS - Australia and New Zealand Hayward Pool Products (Australia) Pty Ltd (ABN 66 083 413 414) (“Hayward Pool Products (Australia)”) distributes Hayward Pool Products in Australia and New Zealand and provides the following warranties:

STATUTORY RIGHTS

1. The benefits to the consumer under this warranty are in addition to other rights and remedies of the consumer under the laws in relation to the goods and services to which the warranty relates; and
2. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You may be entitled to a replacement or refund for a major failure and for compensation for any other loss or damage. You are also entitled to have the goods repaired if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

LIMITED WARRANTY

Hayward Pool Products (Australia) warrants that its products are free from defects in materials and manufacture for 12 months from date of supply by Hayward Pool Products (Australia) plus 90 days to allow for installation and supply (unless otherwise specified). Hayward Pool Products (Australia) will at its discretion, except in the circumstances described below, either repair or replace any

WARRANTY CONTINUED

product proven to be defective during the warranty period for either materials of manufacture or alternatively pay the cost of repair or replacement within 90 days of the receipt of the defective product, barring unforeseen delays. This warranty is for domestic installation only, is personal to the original purchaser and does not pass to any subsequent purchaser(s).

- To the extent permitted by law, Hayward Pool Products (Australia) will not be liable for products which fail or become defective during the warranty period as a result of freezing, accident, negligence, improper installation, water chemistry, misuse, tampering or lack of care.
- To the extent permitted by law, except as set out in this Warranty, Hayward Pool Products (Australia) excludes all statutory or implied conditions and warranties and any other liability it may have to the Customer (including liability for indirect consequential loss) that may arise under statute or at law including without limitation for breach of contract, in tort (including negligence) or under any other cause of action.
- To the extent permitted by law, except as set out in this Warranty, Hayward Pool Products (Australia) limits its liability under any condition or warranty which cannot be legally excluded in relation to the supply of Goods and Services to:
  1. Repairing the Goods;
  2. Replacing the Goods or supplying equivalent Goods or Services again;
  3. Paying the cost of replacing the Goods or of supplying equivalent Goods or Services again; or
  4. Paying the costs of repairing the Goods.

Claims made for warranty, labour or infield support will not be accepted by Hayward Pool Products unless evidence is provided that installation has been completed in accordance with standard warranty conditions. Please refer to specific program document for details.

WHAT TO DO IF YOU HAVE A WARRANTY CLAIM

The faulty product is to be returned to the place of purchase, or where installed by an approved agent to an authorised warranty agent. No returns will be received directly from end consumers by Hayward Pool Products (Australia). You are responsible for arranging removal of the defective product and arranging installation of the repaired or replacement product, all transportation (and any applicable insurance costs) of transporting the product to the supplier and transporting the replaced or repaired product from the supplier. All returns are subject to Hayward Pool Products (Australia)'s written approval and must be accompanied by either:

1. A Field Inspection Report authorised by the Local Customer Service Manager or Authorised Agent; or
2. A "Return Goods Authorisation" form obtained from Hayward Pool Products (Australia) prior to shipment.

UNAUTHORISED RETURNS WILL NOT BE ACCEPTED

- All Hayward Pool Products (Australia) warranty parts taken as an across the counter warranty exchange must be held for inspection authorisation has been given by the Local Branch Customer Service Manager to dispose of them. Hayward Pool Products (Australia) reserves the right to provide replacement or credit for any items authorised under this warranty program.
- All claims must be accompanied by a copy of original purchase receipt, clearly stating date of purchase. All serial numbers must place the product within the warranty period or a proof of purchase is required. No claims in respect of the product can be made after the expiration of the warranty period.

Warranty service requests can be faxed to:
Hayward Pool Products (Australia) Pty Ltd.
Fax: 1300 POOLS2 (1300 766571)
Or submitted to your local Hayward Pool Products (Australia) Branch Office.

A standard form is available to request warranty service. We will require:

- Installation contact information including address, daytime telephone numbers, home phone number, email etc.
- Complete model and serial number
- Proof of purchase (if the serial number was manufactured > 1 year ago).
- Evidence that purchase and Installation was completed in one transaction, by the one business or organisation.
- Nature of problem including specific faults and error codes

To determine if you are eligible for an extended warranty register your Hayward pool products online today at:

www.hayward-pool.com.au

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